WHAT IS CLAIMED IS:

1. An optical system for monitoring or imaging a sample, comprising:

a probe having an optical fiber and a GRIN fiber-size lens fused to one end of the fiber;

an optical splitter or circulator to receive light from a source and to direct a portion of the received light to the fiber; and

an optical detector coupled to receive a portion of light collected from the sample by the GRIN fiber-size lens and to determine a characteristic of the sample from the received light.

2. The system of claim 1, wherein the GRIN fiber-size lens has a focal length of greater than 1 mm.

3. The system of claim 1, wherein the GRIN fiber-size lens has a rayleigh range that is greater than 200 microns.

4. The system of claim 3, wherein the GRIN fiber-size lens has a rayleigh range of at least 500 microns.

5. The system of claim 1, wherein the GRIN fiber-size lens does not have an integral outer optical cladding layer.

6. The system of claim 1, wherein a free end-face of the GRIN fiber-size lens is convexly rounded.

7. The system of claim 1, wherein the monitoring system comprises an optical interferometer having a measurement and reference arms, both arms being optically coupled to receive light from the splitter or circulator, the measurement arm including the probe.

8. The system of claim 7, further comprising:

an optical source coupled to transmit light to the measurement and reference arms and capable of producing light with a coherence length of less than 1 centimeter.

9. The system of claim 8, wherein one of the reference arm and the measurement arm has a variable optical path length.

10. A process for optically monitoring or imaging a sample, comprising:

directing light into an optical fiber;

directing light from the fiber into a portion of the sample with a GRIN fiber-size lens;

receiving light in the GRIN fiber-size lens in response to the received light being scattering or emitted by a region of the sample; and

transmitting the received light to a detector.

11. The process of claim 10, further comprising:

determining one of a density, a depth, and a velocity of the portion of the sample based on the received light.

12. The process of claim 11, further comprising:

producing an image of the sample with data determined by the detector.